

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY**  
(Chapter II of the Patent Cooperation Treaty)  
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 113790:JHK:rw	<b>FOR FURTHER ACTION</b>	See Form PCT/IPEA/416
International application No. <b>PCT/AU2004/001678</b>	International filing date ( <i>day/month/year</i> ) 29 November 2004	Priority date ( <i>day/month/year</i> ) 28 November 2003
International Patent Classification (IPC) or national classification and IPC  Int. Cl. <sup>7</sup> B60C 7/24, 7/28		
Applicant  CROCODILE TECHNOLOGY (UK) LIMITED et al.		

<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 3 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> (<i>sent to the applicant and to the International Bureau</i>) a total of 5 sheets, as follows:</p> <div style="margin-left: 40px;"> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> </div> <p style="margin-left: 20px;">b. <input type="checkbox"/> (<i>sent to the International Bureau only</i>) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or table related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <div style="margin-left: 20px;"> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> </div>	
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Date of submission of the demand 21 June 2005	Date of completion of the report 15 November 2005
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer  <b>L. DESECAR</b> Telephone No. (02) 6283 2381

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/001678

## Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1 (b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-2, 4, 6-9 as originally filed/furnished  
pages\* received by this Authority on with the letter of  
pages\* 3, 5 received by this Authority on 21 June 2005 with the letter of 21 June 2005
- ☒ the claims:
- pages as originally filed/furnished  
pages\* as amended (together with any statement) under Article 19  
pages\* received by this Authority on with the letter of  
pages\* 10-12 received by this Authority on 24 June 2005 with the letter of 24 June 2005
- ☒ the drawings:
- pages 1/3-3/3 as originally filed/furnished  
pages\* received by this Authority on with the letter of  
pages\* received by this Authority on with the letter of
- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to the sequence listing (*specify*):

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/AU2004/001678

**Box No. V** Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)	Claims 1-18	YES
	Claims	NO
Inventive step (IS)	Claims 1-18	YES
	Claims	NO
Industrial applicability (IA)	Claims 1-18	YES
	Claims	NO

## 2. Citations and explanations (Rule 70.7)

Claims 1-18 meet the criteria set out in the PCT Article 3(2)-(4), because none of the prior art documents teaches or fairly suggests a tyre adapted to be fitted onto a wheel rim designed for pneumatic tyres, the wheel rim having a tyre support surface incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the outer periphery of the wheel rim, the tyre comprising a radially inner portion engagable with the wheel rim to be supportingly received thereon, the radially inner portion comprising a band adapted to be releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.

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radially inner portion engagable with the wheel rim to be supportingly received thereon, the radially inner portion comprising a band adapted to be releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.

The welding may comprise welding, such as stitch or spot welding, at  
5 circumferentially spaced intervals around the band.

Preferably, the band comprises a rigid band of fixed diameter.

Conveniently, the rigid band comprises a metal band.

The band may be welded to either one or both of the arcuate portions defining the outer periphery of the wheel rim. There is, however, an advantage in welding the  
10 band only to the particular arcuate portion on the outer side of the wheel rim, as it would allow the tyre to be removed and replaced without the need to remove the wheel rim from the vehicle from which it is fitted.

This fixing arrangement is advantageous, as it is simple yet highly effective. The fitting process simply involves positioning the tyre onto the wheel rim and then  
15 welding the band thereto. For removal of the tyre, all that is necessary is to remove the welded bond, typically by grinding off the welds, and then withdraw the tyre from the rim. In this way, the tyre can be fitted and removed without the need for the services of an experienced tyre fitter. All that is required is access to welding equipment and an ability to weld.

20 It is believed that the welding would not damage the wheel rim to an extent that would preclude use of the wheel rim for its originally intended purpose of receiving a pneumatic tyre, should that be required at some later stage.

While welding is a particularly convenient and effective way of releasably fixing the tyre to the wheel rim, other ways of fixing are also possible, as alluded to

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an outer layer which is harder and more durable to provide good wear characteristics. The outer layer may also have the ability to be re-treaded.

According to a second aspect of the invention there is provided a combination of a wheel rim and a tyre, the wheel rim comprising a tyre support surface  
5 incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the outer periphery of the wheel rim, and the tyre comprising a radially inner portion engagable with the wheel rim to be supportingly received thereon, the radially inner portion comprising a band adapted to be releasably fixed with  
10 respect to the outer periphery of the wheel rim by being welded thereto.

According to a third aspect of the invention there is provided a wheel rim and tyre assembly, wherein the wheel rim comprises a tyre support surface incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the  
15 outer periphery of the wheel rim, and wherein the tyre comprises a radially inner portion engaged with the wheel rim, the radially inner portion comprising a rigid band supportingly received on, and releasably fixed with respect to, the outer periphery of the wheel rim, the band being releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.

20 Whilst the invention as described hereinbefore has been concerned with non-pneumatic tyres, it could also be applicable to pneumatic tyres. For example, the cushioning structure provided on the rigid band may be pneumatic in construction.

### **Brief Description of the Drawings**

The invention will be better understood by reference to the following description of  
25 several specific embodiments thereof as shown in the accompanying drawings in which:

Figure 1 is a perspective view of a tyre according to a first embodiment of the invention;

**The Claims Defining the Invention are as Follows**

1. A tyre adapted to be fitted onto a wheel rim designed for pneumatic tyres, the wheel rim having a tyre support surface incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the outer periphery of the wheel rim, the tyre comprising a radially inner portion engagable with the wheel rim to be supportingly received thereon, the radially inner portion comprising a band adapted to be releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.
2. A tyre according to claim 1 wherein the band comprises a rigid band of fixed diameter.
3. A tyre according to claim 2 wherein the rigid band comprises a metal band.
4. A tyre according to claim 1, 2 or 3 further comprising a cushioning structure provided on the band.
5. A tyre according to claim 4 wherein the cushioning structure comprises a resiliently deformable body bonded onto the band.
6. A tyre according to claim 5 wherein the resiliently deformable body incorporates a plurality of cavities separated by load-supporting walls.
7. A tyre according to claim 5 or 6 wherein the resiliently deformable body comprises a unitary mass.
8. A tyre according to claim 5 or 6 wherein the resiliently deformable body is of composite construction comprising a plurality of layers of material having different characteristics.

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9. A tyre according to claim 8 wherein the body comprises an inner layer of higher resilience for cushioning, and an outer layer which is harder and more durable to provide good wear characteristics.
10. A combination of a wheel rim and a tyre, the wheel rim comprising a tyre support surface incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the outer periphery of the wheel rim, and the tyre comprising a radially inner portion engagable with the wheel rim to be supportingly received thereon, the radially inner portion comprising a band adapted to be releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.
11. A combination according to claim 10 wherein the band comprises a metal band of fixed diameter.
12. A combination according to claim 11 wherein the welding comprises welding, at circumferentially spaced intervals around the band.
13. A wheel rim and tyre assembly, wherein the wheel rim comprises a tyre support surface incorporating a bead seat on each side of the rim, each bead seat comprising an inner seat portion and an outer seat portion terminating in an arcuate portion defining the outer periphery of the wheel rim, and wherein the tyre comprises a radially inner portion engaged with the wheel rim, the radially inner portion comprising a rigid band supportingly received on, and releasably fixed with respect to, the outer periphery of the wheel rim, the band being releasably fixed with respect to the outer periphery of the wheel rim by being welded thereto.
14. A wheel rim and tyre assembly according to claim 13 wherein the band comprises a metal band of fixed diameter.
15. A wheel rim and tyre assembly according to claim 14 wherein the welding comprises welding at circumferentially spaced intervals around the band.

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16. A tyre substantially as herein described with reference to the accompanying drawings.
17. A combination of a wheel rim and a tyre substantially as herein described with reference to the accompanying drawings.
- 5 18. A wheel rim and tyre assembly substantially as herein described with reference to the accompanying drawings.